

Logical reasoning has certain characteristics:

Reasoning can be broken down into **premises** and **conclusions**

Simple **Deductive** reasoning has clear premises and conclusions—

Example: $3+2 = 10-5$

$10-5 = 4+1$

therefore, $3+2 = 4+1$

Example: Burning fossil fuels pollutes the air

Coal and oil are fossil fuels

Burning coal and oil pollutes the air

Reasoning is considered **cogent** if

- 1) The premises are believable (or warranted or justified) given what we already know or believe.
- 2) We consider all likely relevant information
- 3) Our reasoning is **valid** (the premises support the conclusion)

Even though a **cogent** argument *must be valid*, a **valid** argument *does not have to be cogent*.

Validity is not about *truth* but about whether the *premises support the conclusion*

Example: All men walk upright

walks upright

Therefore is a man

What is wrong? Why is this argument **valid** but not **cogent**?

Implied premises

The vast majority of the time, the premises of arguments we encounter are not specifically stated the way they are in the example above. Someone might say, in a derogatory tone, “Why do you drive such a gas-guzzler?” Although this seems to be a question, it is in fact a kind of argument with its premises hidden.

I.

Inductive Reasoning

In **deductive reasoning**, the conclusion is already implicitly embedded in the premises.

Looking at the first example above, even though the first two sentences don’t *explicitly* state that burning coal and oil will pollute, still we can all see where the argument is headed.

Inductive reasoning, on the other hand, is reasoning that moves beyond the premises. It is the sort of reasoning we do every day. We learn from our experiences and the experiences of others; we observe patterns and relationships. We undertake scientific (and sometimes non-scientific) examinations of the world. From all this data, we attempt to reason out how things work, what is best for us, right and wrong, etc.

Inductive Validity

Two ways we reason inductively are 1) **induction by enumeration**, and 2) **analogical reasoning**.

In the first case, we add up instances where “A”=“B” and may conclude that all “A” are therefore “B.”

Caution: The larger the sample size, the greater the accuracy of the conclusion (but even then, we may not be right all the time); sample quality is more important than sample size; only one definite counterexample is all that is needed to refute this sort of reasoning.

In the second case, we reason that if two things are similar in some ways, then they may be similar in some other ways as well. This reasoning is generally better because the conclusion is weaker—it doesn’t say *everything* is the same.

Caution: Only relevant characteristics are important in this sort of reasoning.

Wrong Ideas about Cogent Reasoning

The way the world works does not differ depending on the race or sex of those trying to discover the way the world works.

Self-interest, prejudice, and/or narrow-mindedness often do in fact lead people to reason invalidly.

Self-interest often motivates us to neglect the values or interests of others, even when we share those values.

Ignorance is not bliss: it just renders us incapable of intelligently evaluating claims, premises, arguments, and other sorts of rhetoric we are all subject to every day.

Background Beliefs can be separated into matters of fact and beliefs about values.

Matters of fact and **some beliefs** can also be separated into those that are **true** and those that are **false**.

Two very important aspects of our background beliefs: What we think about the nature of Human Nature, and the reliability of our information sources. These two factors determine a great deal of the choices we make. Problems with either of these factors will cause us to reason perhaps validly, but not cogently.

It is better to reason incorrectly to true (right) conclusions than it is to reason well to false ones.

When reasoning inductively, being “correct” (cogent) in our reasoning does not necessarily mean our conclusions will be right in fact. Sometimes we extrapolate a conclusion that turns out not to be correct in hindsight. But, it is always better to *try* to reason cogently—we’ll have better answers overall and our ability to make correct decisions will improve as we learn.